

GEO TIMES

Professional News Magazine



August 1957

Volume II, No. 2

Published Monthly by the
American Geological Institute

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Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

August, 1957—INTERNAT. ASSOC. OF SEISMOLOGY & Physics of the Earth's Interior, Toronto, Ont.

August, 1957—INTERNATIONAL ASSOC. OF PHYSICAL OCEANOGRAPHY, General Assembly, Canada.

Aug. 19-23, 1957—SIXTH NATIONAL CLAY CONFERENCE, Univ. of Calif., Berkeley. Reg. fee \$6.00: Univ. Extension, Univ. of Calif., Berkeley 4, Calif.

Aug. 19-23, 1957—AASG, Ann. Mtg., Houghton, Michigan.

Aug. 21-24, 1957—ROCKY MTN. ASSOC. OF GEOLOGISTS, North & Middle Park Field Trip. 200 person limit, regist. deadline Aug. 1, '57. Write: R. C. Johnston, c/o Pan Amer. Petr. Corp., P.O. Box 609, Denver, Colo.

Sept. 2-16, 1957—FIFTH CONGRESS OF INQUA, Madrid, Spain. For information write: L. Sole Sabarís, Instituto Geológico, Universidad Barcelona, Spain.

CARBON-14 DATING, 3rd Internat'l. Conf., in conjunction with INQUA, Madrid. Write: M. Rubin, U. S. Geological Survey, Washington 25, D. C.

Sept. 9-13, 1957—PHYSICAL OCEANOGRAPHY & COASTAL ENGINEERING, Special course, A. & M. Coll. of Texas, College Station. Final reg. date: July 6, '57. Apply: R. M. Adams, Dept. of Oceanography & Meteorology, A. & M. Coll. of Tex., College Station, Tex.

Sept. 3-14, 1957—INTERNAT. UNION OF GEODESY & GEOPHYSICS, 11th Gen. Assembly, Toronto, Canada. Add: Dr. J. A. Jacobs, 49 St. George St., Toronto, Ont., Canada.

Sept. 5-7, 1957—NEW MEXICO GEOL. SOC., Eighth Ann. Field Conf. in the Durango-Silverton-Ouray area of S.W. Colo. Limited to 150. Write: Mrs. Marion Murks, Box 652, Socorro, N.M.

Sept. 5-Oct. 9—SIXTH COMMONWEALTH MINING & METALLURGICAL CONG., visiting mining industries from British Columbia to Nova Scotia on invitation of Canadian Inst. Mining & Metallurgy. Write Exec. Sec. 6th Commonwealth M. & M. Cong., 837 W. Hastings St., Vancouver 1, B.C., Canada.

Sept. 9-10, 1957—AMER. CERAMIC SOC., Basic Science Div., State U. of N.Y. Coll. of Ceramics, Alfred Univ., Alfred, N. Y.

Sept. 10-13, 1957—ALASKAN SCIENCE CONFERENCE, 8th, Anchorage, Alaska. Write airmail to Wm. B. Page, Gen. Chrmn., 8th Alaska Sci. Conf., Arctic Health Res. Center, Box 960, Anchorage, Alaska.

Sept. 10-13, 1958—4th INTRNTL. CONG. on Carboniferous Stratig. & Geol., Heerlen, Netherlands. Also 1st Intrntl. mtg. on Coalpetrol-ogy.

Sept. 12-14, 1957—WYOMING GEOLOGICAL ASSOCIATION, 12th Ann. Field Conf., in SW Wind River Basin, hdqtrs. at Lander, Wyo. Write: Mike S. Johnson, Box 2249, Casper, Wyo.

Sept. 12-14, 1957—ARDMORE GEOLOGICAL SOCIETY Field Conference: Criner Hills-Lake Murray Area of South-central Oklahoma. Write: R. B. Harrington, P.O. Box 1099, Ardmore, Okla.

Sept. 20-Oct. 2, 1957—PAN INDIAN OCEAN SCIENCE Congress, Tananarive, Madagascar.

Oct. 4-5, 1957—NINTH INDIANA GEOLOGIC FIELD CONFERENCE on rocks associated

with the Mississippian-Pennsylvanian unconformity in SW Indiana. Sponsored by Ind. G.S. & the Dept. of Geol. of Ind. Univ. Spring Mill State Park.

Oct. 4-6, 1957—49th ANNUAL NEW ENGLAND INTERCOLLEGIATE GEOL. CONF., in the environs of Amherst & central Mass. Spons. by 4-Coll. Geol. Depts., George Bain, Amherst Coll., 1957 Chrmn.

Oct. 6-9, 1957—AIME: SOCIETY OF PETROLEUM ENGINEERS, Fall Meeting: Adolphus, Baker & Statler Hotels, Dallas, Texas.

Oct. 9-11, 1957—AIME: FUELS CONF., Coal Div., Chateau Frontenac, Quebec City.

Oct. 15-18, 1957—SOUTHEASTERN STATES MINING CONF., sponsored by Fla. Sect. AIME & the Soc. of Min. Engrs. of AIME, Hillsboro Hotel, Tampa, Fla.

Oct. 17-18, 1957—AIME: SOUTHERN CALIF. PETR. Sec. Fall Meeting, Biltmore Hotel, Los Angeles, Calif.

Oct. 17-19, 1957—FOUR CORNERS GEOLOGICAL SOC. FIELD CONFERENCE, 2nd Galup New Mex. For information write P. O. Box 615, Albuquerque, N. M.

Oct. 30-Nov. 1, 1957—ROCKY MTS. MINERALS CONF. AIME, Denver, Colo.

Oct. 31-Nov. 1, 1957—AAPG, Biennial Mid-Continent Regional Mtg., Mayo Hotel, Tulsa, Okla.

Nov. 3, 1957—SVP ANN. MTG., Acad. Nat. Sci., Philadelphia, Pa.

Nov. 4-5, 1957—SVP Technical Sessions, with GSA, etc., Atlantic City, N. J.

Nov. 4-6, 1957—GSA, ANN. MTG., Atlantic City, N. J. Geochem., MSA & PS ann. mtgs. in conjunction.

Nov. 6-8, 1957—GULF COAST ASSOC. OF GEOL. SOCIETIES, 7th Ann. Mtg., Roosevelt Hotel, New Orleans, La.

Nov. 7-8, 1957—AAPG, PACIF. SECT., Los Angeles, Calif.

Nov. 7-8, 1957—SEGp, PACIFIC COAST SECTION, Ambassador Hotel, Los Angeles, Calif. Write: J. A. Hugus, Western Gulf Oil Co., 900 Wilshire Blvd., Los Angeles.

Nov. 11-14, 1957—SEGp, 27th ANNUAL MEETING, Statler-Hilton Hotel, Dallas, Texas.

Nov. 12-Dec. 9, 1957—9TH PACIFIC SCIENCE CONGRESS, Pacif. Sci. Assoc., Chulalongkorn University, Bangkok, Thailand.

Dec. 26-31, 1957—AAAS, Nat. Mtg., Indianapolis, Ind.

May 5-7, 1958—AGU, Thirty-Ninth Ann. Mtg., Nat. Acad. Sci., Washington, D. C.

1960—XXIst INTERNATIONAL GEOLOGICAL CONGRESS, Copenhagen, Denmark. Field excursions to Scandinavian countries.

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This Month in **GEOTIMES**



Professional News Magazine

Published by **THE AMERICAN GEOLOGICAL INSTITUTE**

Robert C. Stephenson,
EDITOR

Kathryn Lohman
CIRCULATION MANAGER

Vol. II, No. 2

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Geology at the Grass Roots

The American Geological Institute has four main areas of activities: Public Education, Public Relations, Professional Relations, and Government Relations. It is the principal purpose of the Institute to advance the cause of the earth science professions on these fronts.

Broad policies may be established at a national level, but the application of policies is in large part a local effort involving individuals and groups of individuals. In the field of education for example, the AGI can prepare educational and career guidance literature, support programs of national scope, and maintain liaison with national groups of educators. However, such broad based efforts cannot be successful without effective application at the local level. The same may be said for public relations programs such as the forthcoming Geology Month in Scouting. What better public relations may a profession have than to have individuals and groups representing that profession assume an active role in community affairs?

The American Geological Institute is concerned principally with people and the relation of people to the earth sciences rather than with the sciences. There is every reason, therefore, that there should be a strong relationship between the Institute and the individual. The individuals and local societies working at the "grass roots" level can accomplish much toward the ultimate goals of the Institute. The role of the AGI is to offer cooperation, coordination and service to guide and facilitate these local efforts.

Currently fourteen local geological societies have sought affiliation with the AGI, but lacking a program of relationship this affiliation has been without meaning, either to the local society or the Institute. It is with great anticipation of better things to come that we look to the recently-appointed study committee on Local Society Affiliation, headed by Dr. Robert F. Walters, a former president of the very active Kansas Geological Society.



OUR COVER

Yosemite Valley with El Capitan on left, Clouds Rest and Half Dome in distance, and Cathedral Rocks with Bridal Veil Falls on the right. Photo by courtesy of National Park Service

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geophysics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through, career literature, the scouting program and other channels of communication.

GEOTIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.

Fifty Years of Progress in Geology

by DORSEY HAGER¹

Geological progress over the past fifty years is remarkable. In 1910, Dr. J. F. Kemp of Columbia University devoted only two lectures to petroleum in his Economic Geology. Emphasis was on "hard-rock" geology. Paleontology, stratigraphy, and historical geology were taught by Grabau, then writing his great "Principles of Stratigraphy." Today great emphasis is put on tectonics, historical, structural, and sedimentary geology along with geophysics and geochemistry. Marine and nuclear geology (important to chronology) are new. Mathematics is now essential to understand the new techniques.

High temperatures and pressures of 500,000 to 1,000,000 lbs. show how rocks and minerals may react 80 to 160 miles in depth. X-ray analysis in mineralogy and the electron microscope (2,000,000X) prove invaluable. The uranium-lead, thorium-lead, potassium-argon ratios, Carbon 14 and other methods determine ages of rocks. The potassium-argon method is the simplest as both elements are widely dispersed. The limit of Carbon 14 is 50,000 years. Dating changes our concepts.

Field geology has been greatly accelerated. In Oklahoma in 1914 the term "automobile geologists" was used derisively. Today speedboats, "mud-buggies" in the Gulf Coast, "jeeps", power wagons, "snowmobiles", airplanes and helicopters assist the geologist. Aerial reconnaissance saves weeks in mapping new areas, while aerial photography and photogrammetry supply new tools. Aerial surveys supplemented by ground work shorten over-all time. Maps produced by these methods present three-dimensional pictures, not supplied by ground work. The use of aeromagnetism is now standard practice, and in seeking uranium, flying scintillometers are used. Along the sea-coasts "frogmen" use diving bells and diving suits to sample and to map the dips of submerged rocks. The University of Miami and the University of California (Scripps Institute) at La Jolla, California, teach submarine geology, a new branch of our science.

There have been many advances in geologic tools. Shallow core-drilling, and "slim-hole" drilling now outline structural features. Electrical, neutron and gamma ray logs supplement core

and sample logs. Geiger counters, ultraviolet rays, and thermo-luminescence are new logging aids. Refraction and reflection seismographs, torsion balances, gravity meters, magnetometers, and electrical resistivity are powerful new devices for subsurface mapping. Sonic finders or fathometers as well as seismographs are used for undersea studies.

Before 1907 only a few oil companies emphasized detailed logging. The limestones and sandstones containing gas, oil or water were recorded. Such "skeleton" logs were insufficient. In 1909 in California and Texas, Dr. T. Dumble, Chief Geologist of the Southern Pacific Railroad, initiated detailed logging, and in 1913 geologists in the Mid-Continent forced better cable-tool logging. Today in rotary drilling, which includes $\frac{1}{2}$ of all holes, sampling is a highly developed technique. In "mud" logging, a "cut" of the drilling mud flows to a laboratory truck where gas or oil is mechanically recorded. Time, temperature, electrical, gamma-ray and neutron logs now make logging a special study for subsurface geologists.

MICROPALAEONTOLOGY

Micropaleontology proves to be invaluable in defining depths to "pays"

¹Dorsey Hager, well-known consulting petroleum geologist. This article is a condensation of Mr. Hager's presidential address before the Utah Geological Society.

in the Gulf Coast, and for accurate correlations. In 1920, the rich oil sands at Cushing, Okla., were found to be Ordovician instead of lower Pennsylvanian, below an unconformity defined by paleontologic data. Microfossils, foraminifera, particularly fusulinids, ostracodes, many animal types, spores, diatoms, all forms of microscopic and macroscopic vegetal life are used for correlations and lithofacies studies. Oil company geologists obtain vast quantities of material from surface beds and from well samples. Their work in outlining habitats and lithofacies is proving invaluable in finding gas, oil, and even mineral prospects.

Core analysis determines porosities, grain size, and permeabilities. Acidizing and sand-fracturing largely replace nitroglycerin in completing gas, oil, and water wells, and have greatly added to the gas and oil reserves. Geologists in North America possess a wealth of data obtained from hundreds of thousands of holes, data invaluable in finding new mineral deposits. Historical geologists employ such information. Holes drilled into basement rocks may change some geological concepts. Such data outlined the Nemaha Ridge in Kansas and Oklahoma, and the extension of the Wichita Uplift to the Panhandle of Texas. The 1944 Tectonic Map of the U. S. owes much of its value to well records, especially in the basins, and on the Gulf Coast where 100 offshore gas and oil fields have been found, some 50 miles out, at depths of over 100 feet.

CONCEPTS CHANGE

Up to 1920, it was widely held that deep structural basins were water-logged, but finding oil fields in the basins disproved that idea. It was thought that below 10,000 feet the rocks would be too tight to hold gas or fluids, but the world's deepest oil well, the Richardson-Bass in Louisiana, T.D. 22,570 ft., produces from a sand at 21,440 ft. with porosity 18%, permeability 100 md., bottom hole temperature, 340°F., estimated p.s.i. 17,500. Thousands of wells now produce below 10,000 ft., yet the average depth is only

GROWING AGI SUPPORT

Committee of One Hundred

The Committee of One Hundred for AGI continues to grow, and in the past month six new members have been added, bringing the total to 53. The following have recently pledged membership to the committee:

J. V. Howell

Wayne V. Jones

John R. Suman

F. L. Aurin

F. T. Manheim

Sam D. Rogers

Members of the Committee pledge to contribute \$100 a year, or the equivalent in securities or royalties, for five years in support of the Institute. Persons interested in joining the Committee, thus aiding the Institute in its long-range efforts to get on a more firm financial footing, may write to the American Geological Institute, 2101 Constitution Ave., N.W., for pledge forms. Contributions to AGI, a non-profit organization, are tax-deductible.

Industrial Associates

In the June issue of *GeoTimes* the names of 21 Industrial Associates of the American Geological Institute were published. To this list we are pleased to announce the addition of the following new Industrial Associates:

E. I. Du Pont de Nemours & Co.

Republic Steel Corporation

United States Steel Corporation

The funds contributed annually by these Industrial Associates are very important to the Institute's work in student relations, public education, and public relations.

4,040 feet. What is the limit, 25,000, 30,000 feet or deeper? Only time will tell.

It is now accepted that organic material in fresh, brackish, and marine beds was the source of gas and oil. In 1910, emphasis was on surface structural traps. Such undiscovered traps are now scarce, particularly in the U. S. and emphasis today is on stratigraphic traps. However, many unresolved problems remain, i.e., the function of water in oil accumulation; how oil migrates into the traps. Limestones, once considered minor reservoirs are now eagerly sought as many large gas and oil fields occur in them. The drill will answer

Continued on page 10

GEOLOGY IS FASCINATING

by PAUL E. FITZGERALD

Member, A.A.P.G. Public Information Committee

More than sixty-five science teachers in the public schools of Tulsa, Oklahoma, have just completed an extension course in geology sponsored by the Tulsa Geological Society in cooperation with the Public Information Committee and the Boy Scout Committee of the American Association of Petroleum Geologists. The course included six lectures and two field trips. In-Service Credit was authorized by the Tulsa school authorities for all who completed the course.

The teachers, representing all school levels from the grades through senior high, were enthusiastic students. All of them agreed that geology is, indeed, a fascinating subject. The initial response to the offer of the course was so encouraging that plans had to be made to hold the classes in an auditorium on the campus of Tulsa University. The university, through the good offices of Dr. A. N. Murray, chairman of the department of geology, also provided projection equipment and materials for study including rock and mineral specimens.

The class met one night each week for six weeks. Each meeting included a lecture by a well known Tulsa geologist and authority in his field. The class period was two hours long and ample time was allowed for questions and quizzes. There were two field trips to places of interest within a radius of 75 miles of Tulsa. The trips, made by chartered bus, were planned to introduce the science teachers to rocks and minerals in the field and to show them some typical northeastern Oklahoma physiographic features. The first field trip followed the second lecture and the last field trip came after the completion of all of the lectures.

These field trips were very successful even though the weatherman failed to co-operate. All of the participants made at least one of the trips and most of them enrolled for both. The trips did much to make the lectures more interesting and meaningful. Mr. Paul M. Tucker of Carter Oil Company and Mr. Ralph A. Brant of Atlantic Refining Company planned and conducted the trips.

The lecture schedule provided basic information on mineralogy, petrology, economic geology and historical geology. The

lecturers and their company affiliations are given below.

A. N. MURRAY—Tulsa University

HENRY SCHAEFFER—*Carter Research Laboratory*

PAUL LYONS—*Sinclair Oil & Gas Com-*
pany

A. I. LEVORSEN—Consultant

DANIEL A. BUSCH—Consultant

RALPH A. BRANT—*Atlantic Refining Company*

ROLAND HODDER—Pan American Petroleum Corporation

J. E. UPP—Sinclair Oil and Gas Company

The Tulsa school project followed the organization of a Public Information Committee composed of members of A.A.P.G. and the Tulsa Geological Society. These people believed that the fascinating science of geology was important to every member of the community. They also believed that more attention should be given to the teaching of this subject in the public schools.

Conferences held with school authorities and science teachers revealed a mutual interest in the proposal to form an extension course in geology. Approval for the course was given immediately by Dr. Jess S. Hudson, Assistant Superintendent for Instruction and Miss Lucille Berlin, Supervisor of Science.

A committee under the chairmanship of J. E. Upp was formed to carry out the school program. The enlistment of Upp was a good omen for the success of the Tulsa project since he had long been active in the A.A.P.G. Boy Scout Committee. The project also was fortunate to have the wholehearted assistance of Mr. Roland Hodder of Pan American Petroleum Corporation.

Hodder had been one of the leaders in the organization of the Denver school program sponsored by the Rocky Mountain Association of Geologists. His experience was most helpful to the Tulsa committee with whom he affiliated after his transfer from Denver. These men and the others who gave their time in planning the project, delivering the lectures and conducting the field trips have done a great deal to-

GEOPHYSICAL INSTITUTE RECOMMENDED

Hopes appear brighter that Congress may provide funds to implement the establishment of the Hawaii Geophysical Institute to operate in conjunction with the University of Hawaii. On May 10, 1957, the Honorable John A. Burns, delegate from Hawaii, introduced H.R. 7431 which reads as follows:

"A Bill Making an appropriation to the National Science Foundation to construct and equip a geophysical institute in the Territory of Hawaii.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That under authority of the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861-1875), there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to the National Science Foundation, the sum of \$2,500,000 to be used to carry out the recommendations in its report submitted to the Congress pursuant to the joint resolution entitled "Joint resolution to provide for an investigation of the need for a geophysical institute in the Territory of Hawaii", approved August 1, 1956 (70 Stat. 921)."

A bill H.R. 7754, authorizing the establishment of the Hawaii Geophysical Institute was introduced in the last session of Congress by Mrs. Farrington, delegate from Hawaii (*Geol. Newsletter, October 1955*). Consideration of this bill led to the enactment of Public Law 909, directing the National Science Foundation "to conduct an investigation into the need for and the feasibility and usefulness of a geophysical

institute located in the Territory of Hawaii," and to submit its report to the Congress within nine months.

The Foundation sought the advice of a special advisory committee composed of the following outstanding scientists:

P. H. Abelson
Carl Eckart
Leo Goldberg
Cecil Green
H. H. Hess

M. King Hubbert
Soerre Pettersen
W. W. Rubey
John C. Warner
E. A. Eckhardt, Chmn.

This committee, after study of the whole problem, reported that because of its strategic location, there were valid scientific reasons for establishing a geophysical institute in the Territory. The committee recommended that the institute function as an integral part of the University of Hawaii and that after a preliminary government grant to construct and equip the institute is made, the cost of operation would be the responsibility of the university. The Territorial Legislature has already voted supporting funds in anticipation of favorable action by the Congress of the United States.

The strategic location of Hawaii would permit great and significant additions to our geophysical knowledge of the atmosphere, oceans and the solid earth. Working in conjunction with our outstanding west coast geophysical research centers and the recently established Alaskan Institute, an institute of geophysical research in Hawaii could contribute substantially to studies of great practical importance to the welfare of the nation.

AIME Mining Society Appoints John C. Fox Secretary

John C. Fox has been appointed Secretary of the Society of Mining Engineers of AIME, succeeding Arnold Buzzalini who resigned recently to become a consulting geologist. Fox, a graduate of the School of Mines, Columbia University, and widely known among mining men, came to AIME from the Mining Division of the American Metal Co., Ltd., where he was assistant manager. He served on the staff of the Canadian Mining Journal and was formerly editor of the Mining Congress Journal.

ward explaining the importance of geology to an influential segment of the community.

The merit badge handbook on geology published by the Boy Scouts of America was given to each teacher by the Tulsa Geological Society to be used as an aid in teaching. The film strip and record produced by the Kansas Geological Society was purchased for use by the visual aid department of the Tulsa public schools. This material was also provided by the Tulsa Geological Society.

Plans for the continuation and possible expansion of the project is under consideration by the members of the committee that organized the original project. There is good reason to believe that the success of the initial effort will surely result in a similar program to be offered to the Tulsa science teachers next fall.

GEOLOGIC DATA SHEETS

This is the fourth data sheet to appear in *GeoTimes* and its predecessor, the *Geological Newsletter*. The purpose of the data sheets is to provide useful data in easy-to-file form. This sheet may be clipped out and filed in a convenient-size six-ring binder.

Additional copies may be obtained from the AGI at a cost of \$0.10.

Data Sheets 1-3, *GEOLOGIC MAP SYMBOLS*, are available in sets of three from the AMERICAN GEOLOGICAL INSTITUTE, 2101 Constitution Avenue, N.W., Washington 25, D. C., cost \$0.25 per set. *To colleges and universities a special price of \$0.15 per set applies when purchased in quantities of 10 or more sets.*

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FIFTY YEARS—Continued from page 7

many of these questions, but geologists will be in demand for many years to interpret the new data.

Hydrology was well advanced many years ago. Mapping of the states by the U.S.G.S. covers many new areas. In mining geology, new techniques employ aerial magnetic and electrical resistivity methods with considerable success in outlining certain types of mineralized bodies. Geiger counters, and scintillometers are invaluable in searching for radioactive materials. During World War II the search for radioactive minerals, uranium, thorium, zircon, beryllium and rare earths was accelerated. Such searching employs many mining and former oil geologists, especially those who like "hard-rock" geology.

SOME LEADERS IN THE FIELD

The geologists of the A.E.C. and the U.S.G.S. have done fine service in mapping uranium-bearing beds and in tracing uranium-bearing veins. Also, their flying scintillometers spotted radioactive anomalies which resulted in discoveries. The great Jackpile mine near Grants, New Mexico, was found that way by the Anaconda Company. The uranium boom in 1954 was triggered by Charles

Steen, a former oil geologist, who found the MiVida mine by core drilling. A new uranium finding technique, which measures the heat of radiation in the surface rocks, has been announced by Roger S. Denison.

Fifty years ago many mining geologists followed Van Hise's views that supergene (circulating ground waters) caused the accumulation of ores. Today, such waters are considered important, but magmatic segregations and hypogene waters (deep-seated waters from the magmas) are considered the main sources of mineralization. Emphasis is now put on structural features, on folds and faults, and on sedimentary changes that trap the mineral-bearing waters. In petrology, it is now axiomatic that granitics have been derived not only from magmas, but from metamorphics and from sediments buried in geosynclines and that granitization may result from thermoionic transfer of mineral elements.

The U.S.G.S. has been a leader in geology, but from 1910-1923 the oil companies offered such inducements to Survey men that it lost over two dozen of its ablest workers to them. Today, the Survey is revitalized, largely due to Wm. E. Wrather, a petroleum geologist with administrative and political ac-

OF THE

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The results of investigations of the U. S. Geological Survey are made available through a variety of media such as the regular publication of charts, circulars, hydrologic atlases, topographic and geologic quadrangle maps, State and United States maps, river survey maps, open file releases and publications in various technical and scientific journals. By means of monthly lists and press releases, information concerning new U. S. Geological Survey publications is made available.

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Status of geologic mapping in Alaska.

Lists, by individual States, of geologic and water-resources reports and maps.

Available on written request without charge from U. S. Geological Survey, Washington 25, D. C. Available on order from *Map Information Office* and *U.S.G.S. Public Inquiries Office*.

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Public Inquiries Office of the U. S. Geological Survey are authorized by the Superintendent of Documents to handle over-the-counter sale of Geological Survey book reports, primarily of local interest. These offices cannot handle mail orders.

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men. In oil states, the local Surveys have prospered greatly and make fine contributions to geology. Oil men recognize the value of such studies.

Geological literature on petroleum has greatly increased. The A.A.P.G. and A.I.M.E. bulletins carry not only technical papers, but also scientific studies covering the whole field of geology. Also petroleum geologists contribute to the *Journal of Economic Geology*, *Journal of Geology*, and others.

GEOLOGY RECOGNIZED

In 1913 a score of geologists practiced in the Mid-Continent; a dozen in California. Today out of 13,500 A.A.P.G. members, the Mid-Continent numbers 7,000; New Mexico 1,100; California 3,000; the Rocky Mountains 1,500; an estimated 20,000 geologists belong to various geological societies. Changes in the professional and social status of geologists are most marked. Geologists, once classed with "doodle-buggers", "water witches", and "mediums", today in the Mid-Continent and California enjoy a status equal to that of doctors, lawyers, and ministers. Economic successes also have increased the stature of the geologist. The Standard Oil Co. of New Jersey, the Humble Oil Co., and numerous others are headed by geol-

ogists who occupy top places in business. Many lead in community activities. Ben Bolt of Houston is an outstanding civic leader. In Salt Lake City, William Nightingale heads the Mountain Fuel Supply Co. which supplies natural gas to that area. As past-president of the Chamber of Commerce and president of the Salt Lake City Rotary Club, he also leads in community projects.

Petroleum geologists with their widespread activities have helped the whole geological profession. Once considered "poor orphans", they not only found new gas and oil fields to help in winning two World Wars, but also endowed chairs at universities and created fine research laboratories. Their interests involve all aspects of science conducive to broader knowledge, as evidenced by the activities of the late Everett DeGolyer. His name is one among many.

GEOLOGY'S FUTURE

Numerous unsolved problems will absorb the attention of geologists for the future. Seismic records made around the world give a better idea of the zones within the Earth, but controversy over a solid or liquid core still continues. Internal temperatures are

Survey, Federal Center, Denver, Colorado. Payment should accompany order. Residents of Alaska may order maps of the Territory from the U. S. Geological Survey, Fairbanks, Alaska.

moon, 50 years ago, was supposedly torn from the Pacific Ocean, but is now considered a satellite formed at the Earth's birth. LaPlace's hypothesis and Chamberlin and Moulton's planetesimal hypothesis are outdated. Urey and others improve on the Kantian hypothesis postulating that material similar to that in the "Coal Sacks" of the Milky Way was the source of our solar system. The unity of matter shown by spectrographic and nuclear studies indicates that the Earth's origin ties in with the Cosmos, now expanded in diameter to four billion light years. Improved telescopes will expand these distances.

to explain a cosmology, there is no conflict in viewpoints. When dogmatic beliefs cast aside all scientific findings, no reconciliation of geology with Genesis is possible. Also the theory of evolution greatly affects modern thinking. Man's rise from simple life forms, even today causes much controversy among "fundamentalists" who cling to a literal belief in the Bible. Evolution, it is true, has not solved the greatest of mysteries—life itself. Simple life forms in the Precambrian are now dated at two billion years, primitive man a mere one million years; his origin probably in South Africa rather than Asia. The destruction of myths creates saner views of the Earth and the Cosmos. Mental horizons are broadened. The miraculous still exists as new findings only increase awe at life's complexity and at the immensity of the Universe. The mystery of life may never be solved, but searching for answers is a stimulating challenge.

LOOKING AHEAD

Geology is closely bound with physics, chemistry, biology, and astronomy. To limit to the study of rocks, fossils, and minerals stifles thinking. As earth science, it is the most inclusive of all sciences and should attract the best creative minds, those that can digest the great reservoir of facts to use as guides to clearer thinking and to better living for all mankind.

What the next fifty years will bring, no one knows, but assuredly many of the present geological concepts will be modified or replaced. As man pierces the veils of the Unknown, he finds that as one veil is pierced, a new one confronts him. However, the unending search keeps him mentally alive and lends fascination and purpose to his work. If all the scientific mysteries were to be revealed, scientists would become mentally stagnant and fossilized, but chances of such happenings are few indeed. Geologists can look to a dynamic future with Earth science increasing in importance as geologists themselves increase in mental stature and accept the responsibilities imposed upon them by an expectant society, which seeks and needs leadership in a new way of life.



Since 1957 is the 100th anniversary of the American Institute of Architects, the occasion is right at hand for a bit of publicity. The AIA now has "a new, aggressive public relations program . . . to educate the nation to the indispensability of the architect and to the depth and scope of his services," according to the annual report of the board of directors. Items: a postage stamp issued; tributes to AIA from the floor of both houses of Congress; a double-barreled article on the architect in *Harper's* for May; mentions on Omnibus and other TV programs; and, at the local level, special sections of newspapers to salute the architects of the community. Seems as though two things are needed for such a program: an occasion to hang the celebration on, and a budget for the high-powered public-relations firm that does the job. As for the former, 1959 will be the 100th anniversary of the Drake well, 1963 the 75th of the GSA, and 1967 the 50th of the AAPG. As for the budget, this should be simple. A mere \$2 apiece from the country's 20,000 geoscientists would do the job. The finance committee of the AGI will assure you there is nothing to it. (Weak joke.)

You know what the Fog Index of a piece of writing is? It's an ease-of-reading figure, worked out by Robert Cunnings (*The Technique of Clear Writing*, McGraw-Hill, 1952). It is computed from the number of words per sentence and the number of words of three or more syllables, and it approximates the grade level needed for comprehension. *Time* has a fog index of 10, *Reader's Digest* 9, the comics 6. How about some examples of geology-for-the-layman? Well, Tolsted and Swineford on Kansas Rocks and Minerals, 11; Collinson on Guide for Beginning Fossil Hunters, 10; Christman on geology of a Vermont state forest, 15; and Allen and Balk in a non-technical summary, 15. No generalizations will be made, except to remark that it seems difficult to keep a piece of geology-for-the-public down to the 10th grade comprehension level. For your information, the Fog Index of what you have just been reading is 13. Hope all you folks are college graduates.

GEOLOGY AT NATIONAL SCOUT JAMBOREE

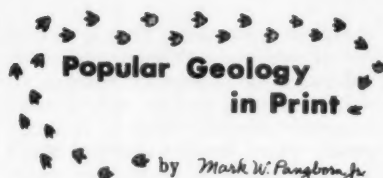
On July 12 about 55,000 boys from every state in the United States and some from foreign countries, convened at Valley Forge State Park, Pennsylvania, to start their week's activity in connection with the Fourth National Boy Scout Jamboree. One of the important parts of their full program was "Conservation Magic."

Every scout had an opportunity to see a motion picture prepared especially for the Jamboree by the conservation agencies of the Federal Government. The movie was shown at three "tent theaters" on the grounds. After the movie each boy received a 64-page book on conservation that will give him many ideas that can be put to work at home, by himself or with his patrol or troop. The book consists of four chapters on (1) *The Geology of Valley Forge*, (2) *Conservation of soil and water*, (3) *Conservation of forests*, and (4) *Conservation of wildlife*.

Geology also played an important part on the nature trails marked by descriptive signs and featuring the geology of the area viewed from the observation tower on a prominent ridge on the western edge of the park. This information was provided by the Pennsylvania Bureau of Topographic and Geologic Survey.

The Jamboree scouts saw some interesting geology at Valley Forge, for the observation tower perched on a ridge of Chickies quartzite afforded an interesting geologic panorama. In the distance to the north, the scouts saw the resistant Precambrian core of the Mine Ridge anticline. Just off the edge of the park area they could observe in a quarry face the striking unconformity between light gray Lower Paleozoic limestone and the brick-red basal Triassic beds. A number of limestone quarries in the Chester Valley could be seen from the observation tower and to the south of the valley could be seen the hills formed by the resistant crystalline rocks of the Piedmont.

Everywhere throughout the encampment scouts congregated in small groups, bartering troop patches, horned toads, and a multitude of objects. Scouts from Maine brought mica and Washington area scouts were trading Miocene sharks teeth. Clint Churchill did an excellent job of explaining the mineral exhibit which was featured by his Phoenix, Arizona, Troop 22 at its campsite.



Books should be ordered by title and publisher from your local book dealer.

We are glad to see a new edition of *OIL FOR THE WORLD*, by Stewart Schackne and N. D. Drake (Harper, 1955, \$2.50), a finely illustrated "primer" on all phases of the oil business; anyone over 13 will enjoy it. *SPEAK TO THE EARTH*, by Max Miller (Appleton, 1955, \$3.75), is a rambling history of oil in the United States, stressing prospecting, drilling, and transportation. Labor writer Harvey O'Connor, in *THE EMPIRE OF OIL* (Monthly Review Press, 1955, \$5), happily dissects the economic and political mores of the petroleum industry; absorbing reading, but O'Connor's hopes for socialization seem unrealistic.

Frank A. Crampton's *DEEP ENOUGH* (Sage Books, 1956, \$4) recounts the earthy reminiscences of an engineer who worked in many a western mining camp. *AURARIA, THE STORY OF A GEORGIA GOLD MINING TOWN*, by E. Merton Coulter (University of Georgia Press, 1956, \$3), pleasantly pictures America's first gold rush.

THE URANIUM PROSPECTOR'S GUIDE, by A.E.C. experts Thomas J. Ballard and Q. E. Conklin (Harper, 1955, \$3.50), is a most informative how-to-do book on a variety of mining and prospecting topics. Kathleen Bruyn's *URANIUM COUNTRY* (University of Colorado Press, 1955, \$2) is a brief history of uranium mining on the Colorado Plateau.

Emily Hahn's *DIAMOND* (Doubleday, 1956, \$3.95) is a vivid, impressionistic picture of the diamond trade, ranging from the DeBeers mines at Kimberly to cutting and marketing activities in Europe. In *ANACONDA* (Dodd, Mead 1957, \$5), Isaac F. Marcossow skillfully traces the company's history from a Montana copper prospect in 1867 to the present world-spanning corporation with manganese, zinc, and other interests.

Engineer Rector Lawrence Lee, in his *GIL'S DISCOVERY IN THE MINE* (Little, Brown, 1957, \$3), has turned out a convincing boy's novel, in which football-crazy Gil Swift comes back from an exciting summer spent in a Colorado mine, determined to master math and enter the School of Mines; high school boys who read this story may be similarly inspired.

MANPOWER in a column -



By HOWARD A. MEYERHOFF
Scientific Manpower Commission

During the past few weeks several geologists have reported to AGI or to the Scientific Manpower Commission that they have been inducted into military service for two years and had just discovered that there is a SPECIAL SKILLS RESERVE PROGRAM requiring only six months of military training. Their question: "How can we transfer?" Answer: "You can't—it's too late." Each of the men in question professed ignorance of the reserve program; hence it may be profitable to repeat information that has already appeared in this column, and to add a few facts about new developments.

The SPECIAL SKILLS RESERVE PROGRAM is open to all men of military age who have a critical occupation and who are employed in an essential activity: All geologists hold a critical occupation, and those who are engaged in research, field exploration, and teaching are engaged in an essential activity. Even graduate students who wish to get their military obligations behind them may apply. The actual period of service may be anticipated and carefully planned, or the registrant may wait until he receives a call for induction and then apply. His application must be supported by documentary evidence that he is employed in an essential activity to which he will return following his six months of military training. After training he will then be screened from the ready to the stand-by reserve; and, although liable to military call, he will have no reserve duties to perform and his recall will be through the Selective Service System.

Since April 1 the GENERAL RESERVE PROGRAM as distinct from the Special Skills Reserve Program, has been opened to all men between ages eighteen and one-half and twenty-five, inclusive. Enlistees will be required to start their six months' training within 120 days after enlistment and to remain in the reserves for 5½ years after active training has been completed. Transfer from ready to stand-by reserve may not take place so quickly, but for scientists whose civilian skills are not needed in the reserves, the delay should not be long. A similar training option is available in the Army National Guard, but here there is no opportunity for transfer to a stand-by basis.

The choice among the several branches

TRADITION in the MAKING



Edward C. Beutner, son of Jones and Laughlin Steel Company geologist, Ed Beutner, has been awarded an International Nickel Company national merit scholarship. The scholarship is one of eight awarded annually by INCO to high school students intending to pursue a career in engineering, geology, metallurgy, or mining. Ted graduated from Mt. Lebanon High School, Pittsburgh, Pa., where he was active in school affairs, and he expects to major in geology at Cornell. He is an avid and accomplished skier and is an enthusiastic collector of mineral and gem materials.

Ted is spending this summer in Alaska with a field exploration party.

GSA

Sets new publication policy

At its meeting in April, the Council of The Geological Society of America authorized the following Prepublication Subscription Plan, effective August 1, 1957.

"A prepublication subscription shall be available to anyone who agrees to receive one copy of every publication of the fiscal year, other than the Bulletin, for payment on invoicing at the close of that year (July 31) at average manufacturing cost without markup."

This new policy is being established for non-member subscribers, including libraries and institutions. It will afford an opportunity for these subscribers to receive copies of all GSA publications including memoirs, special papers, treatises, maps, etc., at substantial savings. Members of the Geological Society of America also have been notified of new publication options available to them.

Persons, libraries, or institutions interested in subscribing to this new plan for the year beginning August 1, 1957, should write to Dr. H. R. ALDRICH, Secretary, Geological Society of America, 419 West 117th St., New York 17, New York.

of the service is still free, as is the choice of two years' service, six months' active training in the reserves, or six months' active training plus reserve service in the National Guard. But once the choice is exercised, it is final. There is no transfer.

LETTERS

DEAR SIR:

We are greatly appreciative of the fine presentation of our new product, the geochemical prospecting kit.

An unfortunate typographical error did creep in, however, when you reported "reagents and equipment needed for approximately 20 analyses," instead of 200 analyses as it should have read.

Sincerely yours,
HAROLD BLOOM
Geochemical Prospecting Laboratory
Denver, Colorado

DEAR EDITOR:

This is with regard to the editorial in the July 1957 GeoTimes relative to the word geology. This whole matter was explained very appropriately by Walter H. Bucher in his article "*International Union of Earth Sciences*" published in the April 1955 issue of the *Geological News Letter*. He pointed out that "geo designates two entirely different things—it meant originally simply the ground, the land on which a man lives, his land. Much later, philosophical thought applied the same word to the whole earth. The difference between geology and geophysics reflects this double mean of geo."

Thus there is no nibbling away or slicing the watermelon but simply a difference in the use of the geo syllable. As Bucher goes on to explain, the geologist is concerned with particular units of the land whereas the geophysicist from the beginning has dealt primarily in the Earth as a whole.

I think that the Bucher article is well worth rereading if not actually republishing in a current issue of GeoTimes. It should do a good deal to clarify the confusion in peoples' minds on this point.

Sincerely yours,
WALDO E. SMITH
Executive Secretary
American Geophysical Union

DEAR EDITOR:

I have read Dr. Laird's article in the last issue of GeoTimes with much interest, and heartily concur in his judgment that too many of our geology majors enter graduate school with inadequate background. He is quite right, also, in laying much of the

blame on the undergraduate teachers who fail to persuade prospective geologists to take the proper courses while undergraduates.

I would like, however, to modify the schedule of undergraduate courses he has proposed. Geology has become a highly specialized profession, as is medicine and the law. Those who are going to be leaders in the field need a broad liberal education as a foundation for their professional training. Since the four undergraduate years are so limited, the student should take less geology as an undergraduate in order to have time for other subjects.

I note, for example, that Dr. Laird makes no provision for biology courses of any sort. Yet many of our Ph.D.'s will become paleontologists and stratigraphers and will need a good background in invertebrate zoology and botany. Few of them will know before their second year in graduate school whether they wish to specialize in these fields or not. Furthermore, many of them will go into teaching and will be assigned as one of their first jobs to teach general geology—both physical and historical. Certainly no one is well qualified to teach historical geology who lacks a solid background in general biology.

Furthermore, most first rate graduate schools now require a real reading knowledge of both French and German. This ability will hardly be attained in a single year's course in each of these languages.

One of the most glaring defects in our graduate students is their inability to write well. More than one college course in English is urgently needed. And, if he is to be a leader in his profession and a good citizen in his community, the geologists need more than one course in history, and he should have broader training in the humanities, particularly in philosophy, logic, and sociology.

Four undergraduate years are hardly enough to start a man on a broad liberal education and if half these years are devoted to geology courses, they are woefully inadequate. Graduate school is, after all, the place for professional training.

Very truly yours,
CARL O. DUNBAR
Yale University

A CAREER IN GEOLOGY AHEAD

A versatile young scientist of promise, Miss Ava Gager, appears headed toward a career in geology, and she is being given an orienting steer by the Kansas Geological Survey.

Miss Gager, who graduated this year from high school in Joplin, Missouri, has already compiled a rather remarkable record. She won honorable mention in the Westinghouse-sponsored National Science Talent Search with her project "The Recovery of Low-Grade Uranium Through Leaching with an Organic Catalyst." She won a first prize at the recent Kansas State Science Fair with her mineral exhibit. She was class valedictorian and was voted by the faculty as the school's most outstanding student.

Next fall she plans to enter the University of Kansas and will work toward a degree in Geology with specialization in mineralogy. However, during this summer, Miss Gager is spending a month as a junior member of the petrography division of the Kansas Geological Survey, where she will have the opportunity to become familiar with various types of research methods.

DEAR EDITOR:

The new GeoTimes format is very attractive and so are the shorter and more numerous articles—but may I say so? I think I miss the banter or (as it has been said) the flippant humor of old Charlie Hunt's Newsletter. Perhaps an occasional narrative of field experiences in lighter vein would add a little spice. Please pardon my taking this liberty.

Very truly yours,
WM. B. UPTON, JR.

EDITOR'S NOTE: We think reader Upton's suggestion a good one—any volunteer authors?

DEAR EDITOR:

I protest the publication in June GeoTimes of the portrait of Susan B. Anticline on the grounds that it will discourage the sweet young females from majoring in geology.

If Susan is normal, why should she be thrust upon us? The fault is yours.

Sincerely,
DR. LIVINGSTONE



THE GRANITE CONTROVERSY, by H. H. Read, 430 pp., 23 illust., Interscience Publishers, Inc., 250 Fifth Ave., New York, \$6.75.

In this attractive book are reprinted eight addresses on the origin of granite and associated rocks by Professor H. H. Read. Geologists everywhere will welcome the opportunity to secure in book form copies of several of these addresses which were published under wartime conditions and have long been out of print. Among them is the much sought "Meditations on Granite" which has become not only a geologic classic, but is justly renowned as an exposition of its author's wit and verve.

The purchaser of this book, however, acquires even more than the reprints. At its end is a comprehensive bibliography, and the book begins with an introductory chapter in which Professor Read gives a frank and straightforward account of the major points of contention, and of the gradual evolution and partial modification of his own ideas during the course of the controversy.

Professor Read's conclusion in the Introduction is an appropriate summing up of the present status of the granite problem: "As a result of these disputations, I believe that no granite problem now exists. Each granite is a unit to be discussed by itself, to be related to its setting and to be interpreted on its intrinsic evidence . . . All of us in this debate started off as violent partisans of one cause or another, but few have remained so. Most of the extremists on both sides have come to occupy a middle position and little now divides us."

A.C.W.

THE GEOLOGY OF NEW HAMPSHIRE: PART III MINERALS AND MINES, by T. R. Myers and Glenn W. Stewart, 105 pp., 1956, published by N. H. State Planning and Development Commission.

The final volume of a series of three covering the geology of New Hampshire (Part I, Surficial Geology, and Part II, Bedrock Geology). The series, intended for the nonprofessional, is certain to be widely used by professional geologists.

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1954, U. S. Geological Survey Bulletin 1054, 484 pp., 1957, Supt. of Documents, Washington 25, D. C. \$1.50.

NATIONAL PETROLEUM BIBLIOGRAPHY, Curtis Stevens, Editor, issued bimonthly by the National Petroleum Bibliography, Box 3586, Amarillo, Texas, \$35.00 per year.

New petroleum bibliography covering much literature on exploration and production, as well as other areas of the petroleum industry. Classified by a numerical system devised by Professor L. C. Uren. A sample copy will be sent upon request.

OIL AND GAS FIELD DEVELOPMENT IN UNITED STATES AND CANADA, Yearbook 1956 (Review of 1955), pp. 1207, National Oil Scouts and Landmen's Association, P. O. Box 1095, Austin 66, Texas. \$10.00.

Primarily of a statistical nature, this volume covers exploratory drilling in the United States and Canada during 1955. Completion data on new discoveries are included as well as information on dry holes. Tables of producing fields list date of discovery, formation, top of pay, average thickness, productive acreage, deepest zone tested, well data, and production figures. Also included is information on geophysical activity, acreage under lease by major operators, natural gasoline plants, carbon black plants, refineries, oil storage, pipeline runs, and pipeline construction.

P.G.B.



ROCK CHIPS by SANDSTONE SAM

"Surface enrichment does not tell us how much ore is present, any more than the smell of bacon and eggs indicates the size of the breakfast." Bloom & Walton, Sci. Amer. July 1957.

OPPORTUNIST—the man who, upon finding himself in hot water, takes a bath.

"The presence of Early Devonian fossils in the upper part of the Hidden Valley dolomite supports the assignation of Middle Devonian age. . ."

Extra dollar is for "water-probe" to add to my collection of tested and proved water finders. Let it not be said that I am not availing myself of the newest and most modern equipment!—J.F.M., Jr.

Lay off fellows!—SsS.

NEW Ideas Products Services

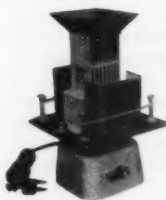
STEREOSCOPE for aerial colored transparencies has been announced for use in field mapping. Similar to the single-prism stereoscope (*GeoTimes* adv. July 1956) this instrument has plates of transparent plastic which transmit light through positive transparencies which may be viewed stereoscopically. Write BOOKLIME, INC., 3735 South 3100 East, Salt Lake City, Utah.

MICRO-GLIDE STAGE is a new precise microscope stage consisting of two circular plates with large bearing surfaces lubricated to assure smooth, accurate, fingertip positioning. Equally useful for low-power scanning, intermediate magnifications and oil immersion work. Write for Bulletin SB 124,

AMERICAN OPTICAL Co., Instrument Division, Buffalo, N. Y.

SEIS MAC is a new, all electronic seismic data processing computer. New equipment corrects automatically for weathering elevation and normal move out, thus minimizing human error. Corrected data make interpretations more rapid and accurate. Write for Bulletin S 318-G, TEXAS INSTRUMENTS INC., Industrial Instrumentation Division, 3609 Buffalo Speedway, Houston, Texas.

VIBRA-PAD is a neoprene coated pad mounted on a rugged three-speed vibrator to accommodate a micro-rifle in splitting fine grained to pulverant samples in the laboratory. For further information write SEPOR MICROSPPLITTER SUPPLY, P. O. Box 645, Panama City, Fla.



Note: The Boy Scout Geology Kit and Program Quarterly for Fall have been printed and have been mailed to those who are cooperating with the October program. There is still time to register with the AGI office if you can help with this program in a council area.



HOW TO KNOW THE MINERALS AND ROCKS

By Richard M. Pearl, Colorado College
192 pages, \$3.75

A practical field guide of more than 125 of the most important minerals and rocks, including gems, ores, native metals, and meteorites. It is simple, authoritative, and up to date . . . written for the student and amateur collector. Typical specimens of minerals and rocks as well as many unusual specimens can be identified by means of its simple keys.

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